

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☐ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER:** _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/806,501	03/22/2004	J. Eric Corban	047291/276113	2777
826	7590	09/14/2004	EXAMINER	
ALSTON & BIRD LLP BANK OF AMERICA PLAZA 101 SOUTH TRYON STREET, SUITE 4000 CHARLOTTE, NC 28280-4000			HARTMAN JR, RONALD D	
			ART UNIT	PAPER NUMBER
			2121	

DATE MAILED: 09/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/806,501

Applicant(s)

CORBAN, J. ERIC

Examiner

Ronald D Hartman Jr.

Art Unit

2121

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) 16-19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) ✓
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 are presented for examination.

Election/Restrictions

2. Claims 16-19 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the telephone voicemail message left to the examiner of record, by the attorney of record, Jon Jurgovan, on September 8, 2001.

For the applicant's convenience, the particulars of the Restriction requirement are provided below:

The application has been Restricted to one of the following inventions:

- I. Claims 1-15 being directed to a system utilizing a linear controller and a neural network, for performing closed loop auto-tuning for a process control system, classified in class 700, subclass 28; and
- II. Claims 16-19, being directed to a method of tuning a neural network, classified in class 706, subclass' 14-15.

Because these two inventions are distinct and independent due to their separate status in the art as shown by their different classifications, and since the search required for Group I is not required for Group II, and vice versa, the restriction for examination purposes as indicated is proper.

Therefore, since group I was chosen by Mr. Jurgovan, claims 16-19 are withdrawn from consideration and these claims should be canceled in response to this office action.

An action appears below on the merits of pending claims 1-15.

Claim Objections

3. Claim 5, lines 3-4, "controlling generating respective degrees" is confusing.
Claim 11, insert "the" in between the words "receive" and "modified".
Claim 14, line 6, the examiner is unsure as to what is meant by "the command signal" since there are 5 command signals claimed in claim 14. The examiner has interpreted this feature, in light of Figures 2 and 4a-4b, wherein two signals are inputted to the Neural Network, resulting in an output, which is transmitted to a summation node.

Priority

4. Priority to U.S. Application No. 08/510,055 that is now U.S. Patent No. 6,092,919 is granted and therefore, the effective filing date of the instant application is 8/1/1995.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 3-5 and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by Mathur et al., U.S. Patent No. 5,625,552.

As per claim 1, Mathur teaches a computer system comprising:

- a linear controller (i.e. Figure 1 element 5), connected to receive a command signal (i.e. Figure 1 element 15) for control of the nonlinear physical process (i.e. Figure 1 element 12 and C1 L13-17) and an output signal from the output of the nonlinear physical

- process (i.e. Figure 1 element "y"), the linear controller generating a control signal (i.e. Figure 1 element "u") based on the command signal, the output signal and a fixed linear model for the process (i.e. C5 L1-16); and
- a neural network (i.e. Figure 1 element 6), connected to receive the control signal from the linear controller (i.e. Figure 1 element "u" being fed back into the N.N. tuner) and the output signal from the nonlinear physical process (i.e. Figure 1 element 66), the neural network receiving the control signal as an input and using the output signal to modify the connection weights of the neural network (i.e. using a back-propagation algorithm; C5 L35-39), the neural network generating a modified control signal supplied to the linear controller (i.e. Figure 1 elements 18 and 18a and Figure 4 element 44) to iterate or approximate a fixed point solution used to control the nonlinear physical process to correct for errors inherent in modeling the physical process using the fixed linear model (Mathur's disclosed automatic tuner provides the capability of performing this specific function, limitation and or feature).

As per claim 3, Mathur teaches the use of a PID controller for the linear controller (i.e. PID controller, Figure 1 element 5).

As per claim 4, Mathur teaches the use of on-line training for the neural network (i.e. C3 L45-50 and C5 L50-55; the closed loop auto tuning, C3 L45-55).

As per claim 5, Mathur teaches the linear controller comprising a plurality of attitude controllers and the neural network comprising a plurality of neural network subunits, the controllers and the subunits controlling degrees of freedom of the output,

Art Unit: 2121

or modified control signal (i.e. Figure 1 elements K_C , K_I and K_D and Figure 6 element 60, layers 1-3).

As per claim 13, Mathur teaches a nonlinear physical system being flight control of an aircraft (i.e. altitude of an aircraft, C1 L13-17).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mathur et al., U.S. Patent No. 5,625,552, as applied to claim 1 above, in view of obviousness.

As per claim 2, Mathur does not specifically teach the use of a PD controller, however, since Mathur does teach the use of a PID controller, the PD controller is viewed to be an obvious variation of the PID controller since each performs the same functions, the only difference being that the PID controller performs an extra function, an integration function, which allows for a more reliable means of controlling the nonlinear system by providing for a more accurate controller design, and this would have been obvious to one of ordinary skill in the art at the time the invention was made.

8. Claims 6 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathur et al., as applied to claim 1 above, in view of Gold et al., U.S. Patent No. 5,213,282.

As per claims 6 and 11-12, Mathur does not specifically teach the system further comprising a command transformation unit for a body angular rate, an inverse function unit or an inertial measurement unit.

Art Unit: 2121

Gold et al teaches a command transformation unit for a body angular rate (i.e. Figure 4 element 158), an inverse function unit (i.e. Figure 2 element 56) and an inertial measurement unit (i.e. Figure 2 element 40), for use in an aircraft flight control system (i.e. Figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Gold into Mathur for the purpose of allowing for the flight control system of Mathur to function effectively in a helicopter, a form of aircraft disclosed by Gold et al, and this would have been obvious to one of ordinary skill in the art at the time the invention was made.

9. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathur et al., U.S. Patent No. 5,625,552, in view of obviousness, and in further view of Gold et al., U.S. Patent No. 5,213,282.

As per claim 14, the rejection of claim 1, from above, is applied equally herein.

Furthermore, the rejection of claim 2, from above, is also applied equally herein.

Furthermore, as per claim 14, Mathur et al teaches the use of a node (i.e. Figure 3; circular element where several signals come together). However, Mathur et al does not specifically teach the use of a derivative filter.

Gold et al teaches the use of a derivative filter (i.e. Figure 2 element 52) for use in a flight control system for an aircraft (i.e. Figure 6).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the teachings of Gold into Mathur for the purpose of allowing for the flight control system of Mathur to function effectively in a helicopter, a form of aircraft disclosed by Gold et al, and this would have been obvious to one of ordinary skill in the art at the time the invention was made.

As per claim 15, the combined system of Mathur et al. (Mathur et al in view of Gold et al) teaches the use of an inversion function unit (i.e. Figure 2 element 56).

Art Unit: 2121

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronald D Hartman Jr. whose telephone number is 703-308-7001. The examiner can normally be reached on Mon. - Fri., 11:30 am - 8:00 pm EST.

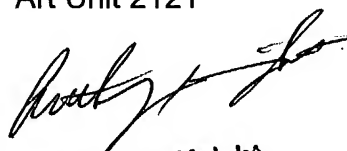
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Anthony Knight can be reached on 703-308-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronald D Hartman Jr.

Examiner

Art Unit 2121



Anthony Knight
Supervisory Patent Examiner
Group 3600